

HP 9000 Computers

A Family of Compatible Workstations



More Than Just Computers: A Computer Family



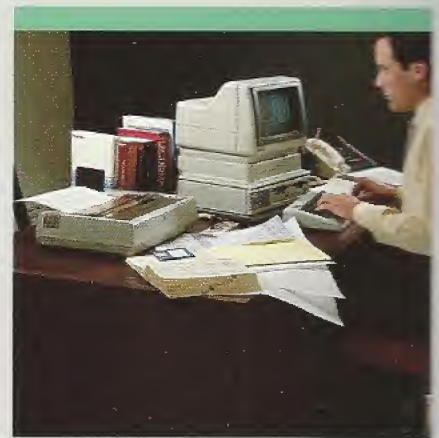
Workstations

When you buy a computer, make sure it has a future. The HP 9000 family from Hewlett-Packard does.

Notice we said "family". The HP 9000s are more than just a collection of computers — they have things in *common*. Common operating systems. Common languages. Common peripherals. Common software. Common networking. And a variety of models to take on different applications. All these things give them a depth of compatibility and range of applications that are extremely rare in a single group of computers. All these will make them productive in *your*

application and will keep you abreast of the very direction productivity is going. In other words, abreast of the future. We'll be talking about all these things in this brochure.

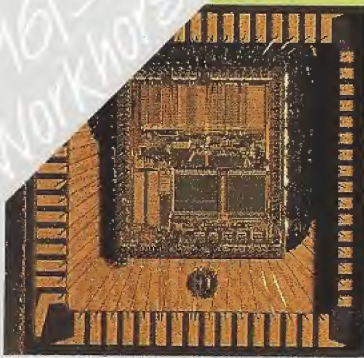
Welcome to a most *uncommon* group of computers — the HP 9000 family. The family with a future.





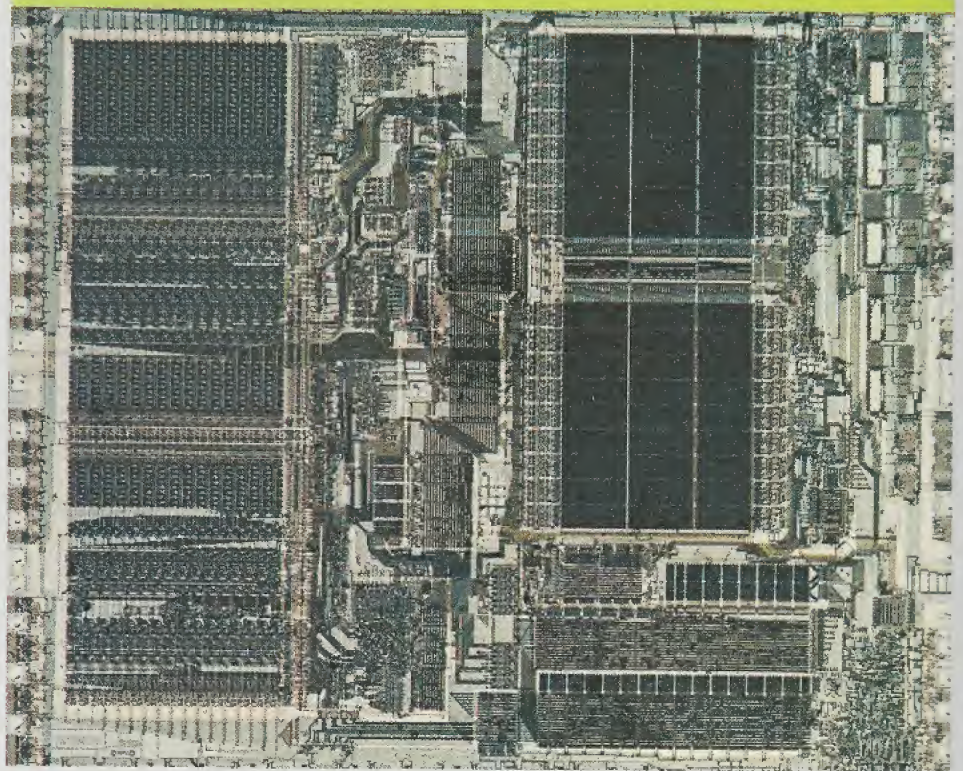
HP 9000 16/32-bit and 32-bit Technology

The 16/32-bit
"Workhorses"



Desktop computing was built on the 8-bit computer. When 16-bit computing arrived, the standard suddenly went up: applications that used to take seconds now took milliseconds. Several of HP's early desktop computers were built on its own proprietary 16-bit microprocessors.

In the early 1980's, HP incorporated the 16/32-bit Motorola MC 68000 microprocessor into its technical computers. With a 32-bit internal data path and 8-MHz clock, the 68000 is widely regarded as *the* high-performance 16/32-bit "chip" on the market today, in addition to being reliable and inexpensive. It became the basis for all our Series 200

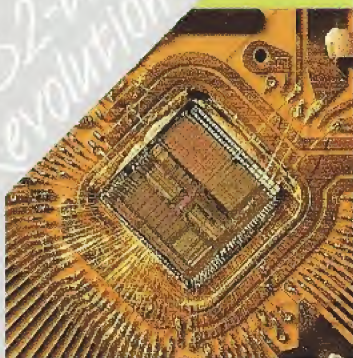


computers. The decision proved to be a good one — it allowed our customers to have access to 16/32-bit computers long before the industry in general "caught up". In addition, the models were compatible with each other. More recently, Series 200 computers have incorporated a faster option — a 12.5-MHz version of the 68000 — providing even more speed in 16/32-bit computing.

Many of our customers regard these 16/32-bit computers as the "workhorses of the 1980's" —

working for *them*, as they can for you.

The 32-bit Revolution

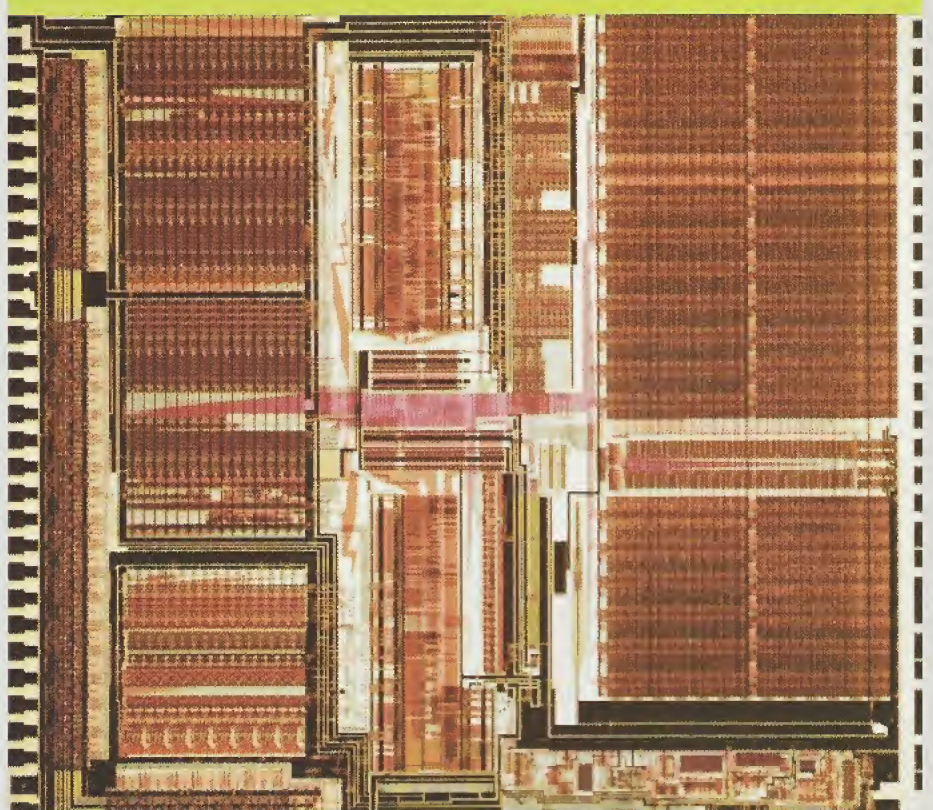


powerful as the common "personal" computer by accepted measures of performance. And the same VLSI (Very Large Scale Integrated Circuit) technology that gave us the 32-bit chip also gave us random-access memory (RAM) chips with over 600,000 transistors — so the entire circuitry could consist of only 98 chips rather than the usual 5,000 found in most 32-bit models.

Now, 32-bit mainframes are no longer the exclusive domain of the "machine room". Clearly, they have arrived on your desk.

Then, in 1981, Hewlett-Packard made a giant technological breakthrough — it announced the world's first full 32-bit single-chip CPU. On a piece of silicon barely a quarter-inch square, it succeeded in placing a total of 450,000 individual transistors. It was the functional heart of a mainframe computer in an area the size of a fingernail!

The HP 9000 Series 500 computers all contain this chip. Introduced in November 1982, the Series 500 is available in desktop workstation, console and box models. With a speed of over one million instructions per second, the Series 500 is judged to be at least 100 times as



HP 9000: Matching Computer and Application

Series 200

The Series 200 (MC 68000-based) is HP's line of 16/32-bit computers. Series 200 runs BASIC or Pascal in stand-alone configurations, or HP-UX (our UNIX* operating system), giving you the advantages of an industry-standard operating system.

We called 16/32-bit computers the "workhorses" of the 1980's — with good reason. The uses and applications in which they have proven successful include a wide variety of scientific and engineering tasks — laboratory analysis, factory automation, integrated circuit design, printed circuit board design, mathematical modeling and statistics, 2-D mechanical drafting, etc. Several models are available — with a variety of interfaces, peripherals and memory — to match these different applications. The Series 200 is available with the HP BASIC, Pascal or HP-UX† operating systems.



For engineering or scientific calculations which require 16/32-bit speed and data-handling capabilities, Series 200 computers in stand-alone configurations offer you low-cost, reliable performance. When combined with the Series 500, they can serve as the "low end" performance in a complete workstation-mainframe configuration — for example, a

Model 236 can serve as the individual "schematic capture" machine for electronic design, feeding its data later to a Series 500 mainframe for the extensive "number crunching" operations of logic design, simulation, physical design, etc. You'll find the various models and potentials of the Series 200 described on the following panel.

Series 200

Model	Type	CRT Size (diag.)	Maximum Internal Memory*	Integrated Peripherals	Maximum Backplane—I/O Slots Avail.*	Languages/Operating Systems
216	Personal	9-inch	768 Kbytes	None	2	BASIC/Pascal
220	Modular/Rack	Available separately	3.9 Mbytes	None	15	BASIC/Pascal/HP-UX
226	Desktop/Rack	7-inch	2 Mbytes	Single 5¼" floppy disc (264 Kbyte)	8	BASIC/Pascal
236	Desktop/Wrkstrn. (monochromatic or color CRT)	12-inch	2 Mbytes	Dual 5¼" floppy disc (528 Kbyte)	8	BASIC/Pascal/HP-UX

* UNIX is a trademark of Bell Laboratories. HP-UX is a trademark of Hewlett-Packard and represents its implementation of UNIX.

† The Series 200 HP-UX operating system is available on Models 220 and 236.

* An external backplane expander is available for Series 200 which allows up to 5.3 Mbytes additional memory or 32 interface cards to be added, or combinations thereof.

The HP 9000 Computers:

A Family Portrait

Series 200

Model 216

Model 216 is the smallest and most "personal" computer of Series 200. One of the most powerful personals on the market, it has a 9-inch CRT and a memory range from 128K bytes to 768K bytes. It is ideal for any administrative or "paperwork" project — documentation or word processing, for example — while still retaining all the computational power of the larger models.

Model 220

Model 220 is an ideal 16-bit controller. Rugged and modular, it can easily fit into and survive a factory or warehouse environment — while still serving as an excellent 16-bit "engine" in more complex design and engineering problems. It has a full complement of optional keyboards, monitors and other peripherals to make up a total computer system — not to mention a vast array of compatible HP instruments for all types of measurement, test and control applications.



The HP 9000 family is based on common technologies and operating systems, so each can handle similar applications. However, when applications demand specific computers, each computer is optimized with enough "personality" to handle the job better than the rest. The following is a "family portrait" which shows these relative strengths, along with selected hardware specifications.

Model 226

With its smaller 7-inch CRT and built-in minifloppy drive, Model 226 is equally at home in instrument test/control applications or sophisticated computational assignments. Its compact, box-like shape lets it fit easily into instrument racks, but you still "know it's a computer" when you put it on your desk and solve problems. Internal memory ranges up to 2 Mbytes, expandable to over 7 Mbytes externally.



Model 236

With its full 12-inch CRT and twin floppy drives, Model 236 is the most integrated computer of Series 200, serving as a low-cost computer-aided design (CAD) workstation. Like all Series 200 machines, it has a built-in HP-IB interface for peripherals and instruments. The color version offers all this plus 4,096 color shades and color mapping. Its applications range from electronic design to mechanical drafting to computerized graphics – and everything in between.



Series 500

Model 520

The Model 520 is an integrated workstation, suitable for placing on a desk (or side table). With integrated mass storage (5¼-inch floppy disc with optional 10 Mbyte Winchester) and black-and-white or color CRT (4,913 shades), the Model 520 is truly the "mainframe on a desk" that every engineer will have someday to solve the *entire* range of engineering and scientific problems that come his or her way. Like all Series 500 machines, it has a variety of HP peripherals to choose from. Up to 2.5 Mbytes internal memory available.



Model 530

The Model 530 of Series 500 is a compact, rack-mountable computer which can fit almost anywhere to serve as the heart of a sophisticated computational system, either single- or multi-user. Peripherals to make a complete system include terminals, monitors, mass storage devices, printers and plotters. Like the Model 520, the Model 530 can have up to 2.5 Mbytes internal memory.



Peripherals and Interfaces

All HP 9000 computers — Series 200 and 500 — offer you a complete range of peripherals from which to configure a total system, including printers, plotters, disc drives, graphics tablets, terminals and I/O-memory expanders. The “HP-IB” interface (our implementation of IEEE standard 488-1978) ensures you instant compatibility between an HP computer and an HP peripheral. Other interfaces available include RS-232, GPIO (16-bit parallel), BCD*, Asynchronous 8-Channel Multiplexer† (for connecting terminals), Datacomm and Programmable Datacomm*. In addition, you may choose from a wide variety of keyboards for international use — French, Spanish, German, Katakana (Japanese) and Swedish/Finnish.

Like the 9000 family itself, HP peripherals, interfaces and accessories are designed to make you productive *immediately*, no matter where you start.

* Series 200 only.

† Series 500 only.

Model 540

The Model 540 uses the same processor module as the Model 530, but in a large console ideal for placing in a “furniture” environment. Up to 6 terminals can be connected to one Model 540, in addition to a large color monitor, disc drive, printers, plotters and other peripherals common to Series 500. The Model 540 is ideal for many project management procedures — planning, document preparation, data entry, etc. — while still possessing all the power to handle the most demanding scientific and engineering problems.



Series 500

The Series 500 is HP's full 32-bit computer line. Based on our proprietary 32-bit chip, they are among the most powerful computers for their

size ever built. Models are available for desktop, rack or multi-user environments such as offices and engineering project areas.

And most amazingly of all, Series 500 can contain not only one CPU or even two, but three — by the simple addition of plug-in CPU cards, you can upgrade Series 500 to two or three computers in one! No reprogramming is necessary; the internal operating system makes all conversions for you automatically. The addition of these CPU boards can increase the power and speed of your 32-bit machine up to 2.8 times! Like the Series 200, the Series 500 is available with the HP-UX operating system — which gives you FORTRAN, Pascal and "C" compilers — plus stand-alone BASIC on the desktop model. And



any Series 500 model can have up to 2.5 Mbytes internal memory.

For applications which require 32-bit "number crunching" and speed, Series 500 offers you the alternative to a super mini-computer or mainframe. Three-dimensional modeling, finite element analysis, complex mathematical matrices, integrated/printed circuit design, and

analysis, mechanical drafting and design, noise and stress analysis, software engineering — these are but a few of the many applications in which you can put the Series 500 to use. As the "high end" in a Series 200/500 system, they can form the computational basis for the most complex and demanding tasks.

Series 500

Model	Type	CRT Size (diag.)	Maximum Internal Memory	Integrated Peripherals	Maximum Backplane/ I/O Slots Available	Lang./ O.S.
520	Integrated Workstation (monochromatic or color CRT)	13-inch	2.5 Mbytes	Thermal printer (opt.) 5 1/4" floppy (264 Kbyte) 5 1/4" fixed disc (10 Mbyte) (opt.) Light pen (opt. — BASIC only)	4 [†]	BASIC/ HP-UX
530	Rack-mountable box *	Available separately	2.5 Mbytes	None	7 [‡]	HP-UX
540	Stand-alone cabinet *	Available separately	2.5 Mbytes	None	7 [‡]	HP-UX

* Requires terminal and mass storage to operate.

† Expandable to 20 I/O channels via I/O Processors and Expanders.

‡ Expandable to 23 I/O channels via I/O Processors and Expanders.

Making the HP 9000s a Family: Languages, Operating Systems and Software

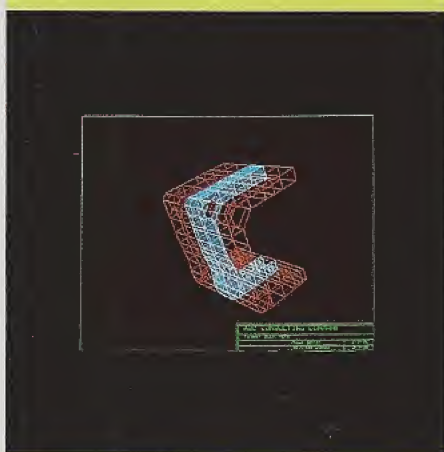
Languages, operating systems and software are what make the HP 9000s a true computer *family* rather than just a diverse collection of hardware.

HP 9000 computers offer you a variety of languages to take full advantage of their computational capabilities. HP BASIC is regarded by many of our customers as the finest

version of BASIC ever written. It is easy to learn and structurally simple, yet immensely powerful. The enhanced graphics capability of HP BASIC can, for example, reduce a complex set of quantum equations to a clear atomic "cross-section" — or an almost endless variety of similar things. And it uses clear, high-level commands for its graphics rather than obscure, hard-to-learn escape sequences. Its I/O extensions give you highly responsive, interactive instrument control. HP BASIC provides instant start-up, easy interactive program editing via a "scrolling" rotary control knob (on the Series 200), extensive debug and trace tools, 15 levels of prioritized software interrupt and structured programming constructs to organize your code. On the Series 500, BASIC operates in a multiprogramming (foreground/background) environment.

Besides all this, HP BASIC is a complete operating system unto itself - it needs no other to run.

HP Pascal is a highly sophisticated tool for the advanced programmer. A compiled language, Pascal offers you extremely high speed and the ability to "fine-tune" your machine to specific applications. It has powerful and versatile programming structures, and extensive debugging capability for software troubleshooting. Of particular interest are the



Enhanced I/O Procedure Library (which lets you solve complex interfacing tasks with powerful features such as Direct Memory Access and Interrupt Transfers), and the Enhanced Graphics Procedure Library which allows you to create drawings with any combination of lines, text and polygons, and output them on a wide range of peripherals.

To all of the above, HP 9000 computers add a rich offering of application software, upgrading raw computer power to computer solutions.

HP offers you software of two types — its own and that developed by third parties. HP software is a fully tested and supported product developed by HP, while HP PLUS, our third-party product, is supplied by outside vendors whose sole business is developing software for specific applications.

Included in our software are such widely useful packs as Word Processing, Computer-Aided Presentations, VisiCalc[†], Forecasting, Project Management, Math and Statistics, and Utilities Libraries. In addition, there is a wide assortment of packs aimed specifically at the electrical and mechanical engineer — Circuit Simulation, Waveform Analysis,

Filter Design, Schematic Entry, Electronic and Printed Circuit Design, Mechanical Drafting, Finite Element Analysis, Numerical Control Tape Preparation and 3-D Design Systems. Finally, there are highly specialized packs such as SOFTOOL (software development) and MISTRESS (a relational database).

In all, HP and HP PLUS offer you over 300 individual software packs — and the list is always growing.

Besides BASIC and Pascal, HP now provides the UNIX operating system.

HP-UX is HP's implementation of System III UNIX developed by Bell Laboratories — the system that is being chosen by more and more computer professionals as computer technology moves toward the goal of universal software compatibility.

HP-UX is fully compatible with standard UNIX systems, giving you contact with a virtually unlimited expanse of software and computers to augment your own work. In addition, HP-UX adds several innovations of its own — a choice of languages (Pascal,

FORTRAN 77 and C), virtual memory,* multiple CPU support*, multi-tasking, single- or multi-user capability, and a rich assortment of engineering tools such as IMAGE data base management*, 3-D graphics* and datacomm. For complex problems involving several software programs, HP-UX also offers the ability to connect or "pipeline" separate programs together via a set of simple commands.

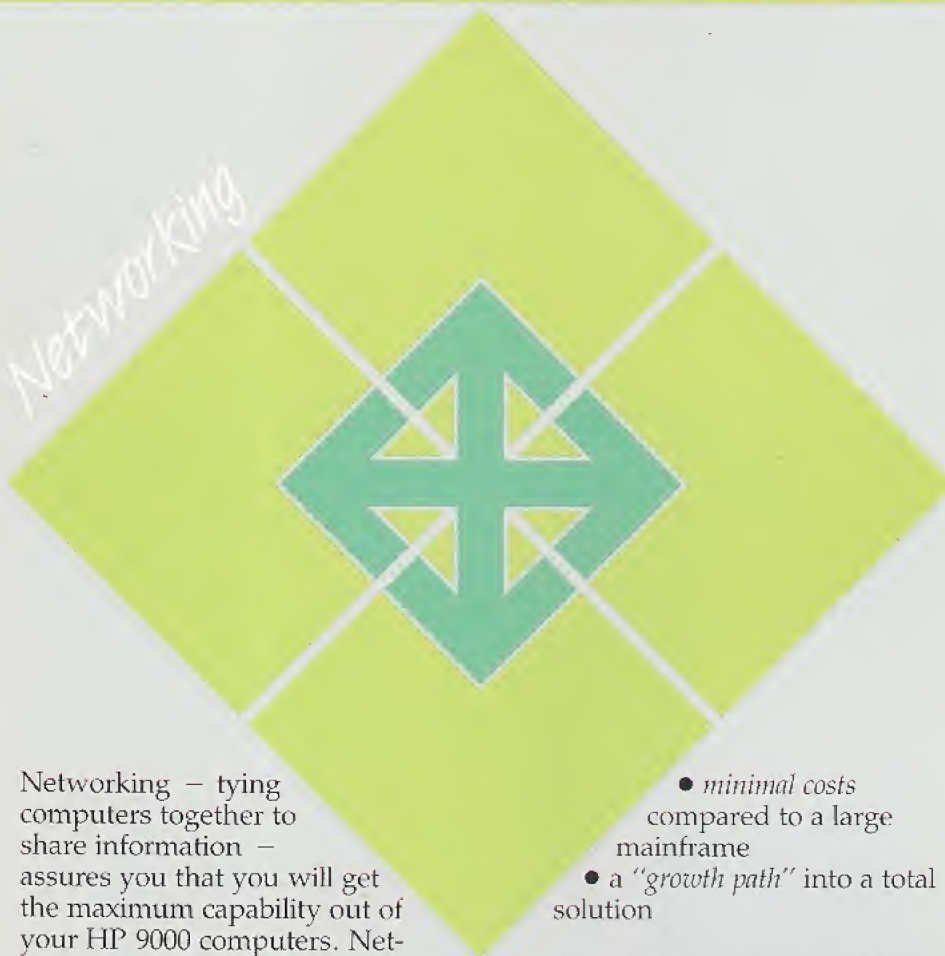
The C language is HP-UX's means of transporting software from other UNIX systems. It has a terse syntax, plus certain data and control structures similar to Pascal's, offering programmers an even closer, more efficient interface to the hardware than Pascal.

FORTRAN 77 is a powerful mathematical language. It is a full implementation of the ANSI X3.9-1978 standard so software portability is assured, letting you tap a huge base of available engineering software. It also provides many extensions for more structured program development and more flexibility in scientific computing. The result is a modern, precise programming language that allows for growth in many directions.

* Available on the Series 500 only.

† VisiCalc is a registered trademark of VisiCorp.

HP 9000 Family Connections



Networking — tying computers together to share information — assures you that you will get the maximum capability out of your HP 9000 computers. Networking gives you:

- your own *individual mainframe*, so that power is placed where it is needed most
- *individual performance* which greatly exceeds that of a typical mainframe on a cost-per-user basis
- access to the *most recent ideas*, calculations and documents of others. . .
- *protection* — when one computer goes down, all is not lost. . .
- *minimal costs* compared to a large mainframe
- a “*growth path*” into a total solution

Hewlett-Packard has made a major commitment to networking in the HP 9000 family.

Beginning with the simplest, there is Shared Resource Management, or SRM. SRM allows several users to connect their individual HP 9000 computers to a common disc drive, printer or plotter, thus saving tremendous cost over the “one-peripheral-one-computer” concept and allowing individual users to share a common disc file



(while still protecting security, if needed).

Ethernet, available on the Series 500, lets up to 100 users of 32-bit computers communicate directly with each other. Each mainframe has access to other mainframe files and programs (again with secure access if need be). For example, you could, from your own computer, initiate a program in another building — or abort it. Or you could load in another computer's program to run on your own.

In the future, Hewlett-Packard will strive for total communication between its various computers — and with those of other major computer companies as well. The standard for this universal communication — IEEE-802 — is now under development, with HP as a major participant. It will operate between all members of the

Quality Plus Technology = Hewlett-Packard

HP 9000 family – Series 200 and 500 – plus the HP 1000 and HP 3000 mainframes. And of course, non-HP computers. In addition, it will operate on Ethernet and SRM!

This means that, in the future, if you buy HP equipment, you will be able to communicate not only with other HP equipment, but with another supplier's equipment you may have bought for another use. Only your imagination is the limit on how such an arrangement could be used to enhance your productivity!

Quality

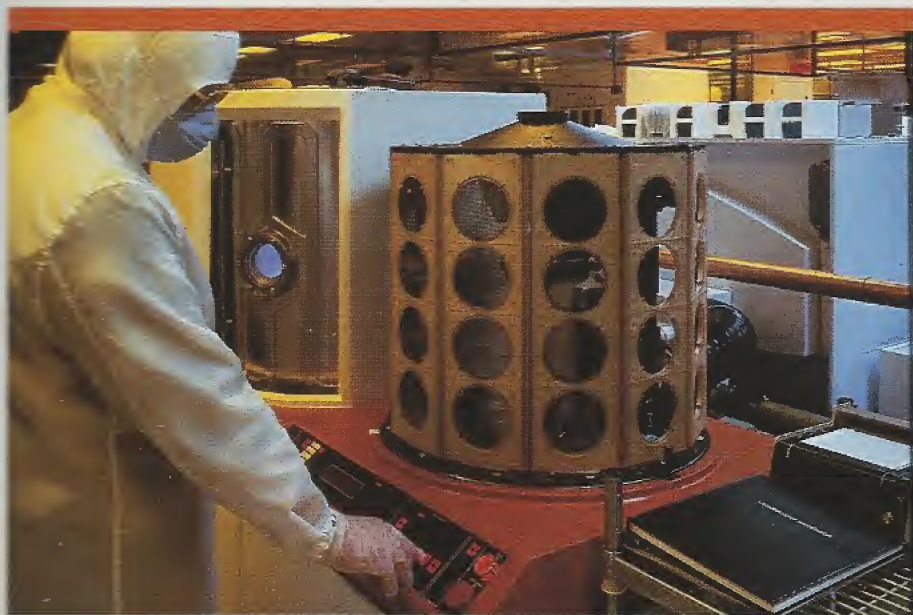
For over forty years, Hewlett-Packard has been making electronic products marked by two distinctive qualities – technological innovativeness and quality. You've seen the technology. Now let's consider quality.

We build quality into each and every computer we sell. Beginning with the most reliable components on the market (we still test them), we design quality in from the ground up – not as an

afterthought. Before manufacture, each new computer model is subjected to STRIFE (stress-life) testing, which includes widely ranging temperature and humidity, power fluctuations and intense functional tests designed to stress all components of the system. Before sale, every unit is carefully inspected for appearance and quality assurance norms. You can expect your HP computer to be around for a long time, supporting your application just like new.

When you buy from HP, you are also assured of dealing with one vendor. We offer not only computers, but peripherals, software, operating systems and networks to make them work . . . in other words, the total system. You don't need to roam all over the market searching for parts. And we support that system – our worldwide support organization has been quietly setting industry standards for years. When you buy from HP, you don't have to wonder whether we'll be around later to support you – we will. No matter where you are.

So contact your local HP sales representative for a closer look at the HP 9000s. And welcome to the family.



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